Attorney Docket No. 1018656-000678

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of	)	**MAIL STOP**
	)	**APPEAL BRIEF - PATENTS**
Tomohiro Yamaguchi et al.	)	
	)	Group Art Unit: 2625
Application No.: 10/662,443	)	
	)	Examiner: Quang N Vo
Filed: September 16, 2003	)	
	)	Appeal No.: _______________
For: IMAGE PROCESSING APPARATUS AND IMAGE PROCESSING METHOD	)	
	)	
	)	
	)	

APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This appeal is from the decision of the Primary Examiner dated February 1, 2011 finally rejecting claims 1-25, which are reproduced as the Claims Appendix of this brief.

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The Commissioner is hereby authorized to charge any appropriate fees under 37 C.F.R. §§ 1.17 and 41.20 that may be required by this paper, and to credit any overpayment, to Deposit Account No. 02-4800.

I. Real Party in Interest

Konica Minolta Business Technologies, Inc. is the real party in interest, and is the assignee of Application No. 10/662,443.

II. Related Appeals and Interferences

The Appellants' legal representative, or assignee, does not know of any other appeal, interferences or judicial proceedings which will affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

III. Status of Claims

This application contains claims 1-25. Claims 1-25 are pending in the application and stand finally rejected. Claims 1, 6, 11 and 14 are independent. Claims 2-5, 7-10, 12, 13 and 15-25 are dependent.

IV. Status of Amendments

No claim amendments were submitted in response to the final Office Action dated February 1, 2011 (hereinafter "final Office Action").

V. Summary of Claimed Subject Matter

Exemplary embodiments of the present disclosure provide an apparatus and method that minimize deterioration in output image quality by appropriately distinguishing the attributes of image areas, particularly halftone-dot regions, and performing processing properly suited to such areas.

As illustrated in Figure 1, for example, an exemplary embodiment provides an image processing apparatus comprising a region determination unit 2, which includes a character determination unit 3 and a halftone-dot determination unit 4. As illustrated in Figure 2, for example, the halftone-dot determination unit 4 includes a dividing unit 40 for dividing image data into large blocks of a prescribed size and

further subdividing the large blocks into multiple smaller blocks. For example, as described in paragraphs [0025]-[0026] on pages 9 and 10 of the specification and as illustrated in Figure 3, the dividing unit 40 divides the image data into large blocks having a size of M x N pixels, and further divides the large blocks into smaller blocks ① through ⑤ having a size of (i) x (j) pixels.

As illustrated in Figure 2, for example, the disclosed image processing apparatus also includes a large block isolated point calculation unit 46 for calculating a number of isolated points contained in each large block established by the dividing unit 40. In addition, as illustrated in Figure 2, the disclosed image processing apparatus includes a small block isolated point calculation unit 41-45 for calculating a respective number of isolated points contained in each small block ① through ⑤ established by the dividing unit 40.

Furthermore, the disclosed image processing apparatus includes a halftone-dot region determination unit 47-49 for determining whether or not a large block is a halftone-dot region. As described in paragraph [0031], the halftone-dot region determination unit 47-49 determines that a large block is a halftone-dot region if the following two conditions are satisfied: (1) <u>all small blocks contained in the large block have an isolated point contained therein</u>, based on the respective number of isolated points that are calculated for each of the small blocks, and (2) the number of isolated points calculated to be contained in the large block is greater than or equal to a first prescribed value (e.g., threshold value illustrated in Figure 2).

Accordingly, the disclosed embodiment provides that the halftone-dot region determination unit 47-49 makes <u>two determinations</u>. In a first determination, the halftone-dot region determination unit 47-49 determines whether <u>***all*** small blocks contained in the specified large block have an isolated point contained therein</u>, based on the respective second numbers calculated by the small block isolated point calculation unit 41-45. In a second determination, the halftone-dot region determination unit 47-49 determines whether the number of isolated points contained in the large block is greater than or equal to a first prescribed value.

Accordingly, the algorithm used by the halftone-dot region determination unit 47-49 means that the determination will be false <u>if at least one small block does not have an isolated point contained therein</u>, even if the second determination reveals

that the number of isolated points contained in the large block is greater than or equal to the prescribed value.

Independent claims 1, 6, 11 and 14[1] recite various features of the above-described exemplary embodiments. Claims 1 and 6 recite an exemplary apparatus, and claims 11 and 14 recite an exemplary method.

1. An image processing apparatus that handles image data, comprising:	Image processing apparatus illustrated in Fig. 1
a dividing unit for dividing image data into large blocks of a prescribed size and further subdividing the large blocks into multiple smaller blocks;	Dividing unit 40 in Fig. 2; see, e.g., paragraphs [0025] and [0026] on pages 8-10 of the original specification. As illustrated in the example of Figure 3, the dividing unit 40 divides the image data into large blocks (darker rectangle) having a size of M x N pixels, and further divides the large blocks into smaller blocks (lighter rectangles) 1 through 5
a large block isolated point calculation unit for calculating a first number of isolated points contained in each large block established by said dividing unit;	Large block isolated point calculation unit (adder) 46 in Fig. 2; see, e.g., paragraph [0028] on page 10
a small block isolated point calculation unit for calculating a respective second number of isolated points contained in each small block established by said dividing unit; and	small block isolated point calculation unit (counters) 41-45 in Fig. 2; see, e.g., paragraph [0027] on page 10
a halftone-dot region determination unit	halftone-dot region determination unit

[1] For the convenience of the Board, a mapping of claims 1, 6, 11 and 14 to exemplary embodiments disclosed in the specification and drawings is provided below to illustrate support for the features of the claimed invention. The references to the disclosed embodiments is not exhaustive, and the claimed invention is not intended to be limited to the referenced embodiments.

for determining that a specified large block among the large blocks established by the dividing unit is a halftone-dot region if all small blocks in the specified large block have an isolated point contained therein, based on the respective second numbers calculated by the small block isolated point calculation unit, and if the first number of isolated points calculated to be contained in the specified large block by the large block isolated point calculation unit is greater than or equal to a first prescribed value.	(comparator 47, OR circuits 48, and AND circuit 49); see, e.g., paragraphs [0029]-[0031] on pages 10-12

6. An image processing apparatus that handles image data, comprising:	Image processing apparatus illustrated in Fig. 1
a dividing unit for dividing image data into multiple small blocks;	Dividing unit 40 in Fig. 2; see, e.g., paragraphs [0025] and [0026] on pages 8-10 of the original specification. As illustrated in the examples of Figs. 2 and 3, the dividing unit 40 divides the image data into smaller blocks 1 through 5
a small block isolated point calculation unit for calculating a respective first number of isolated points contained in each small block established by said dividing unit;	small block isolated point calculation unit (counters) 41-45 in Fig. 2; see, e.g., paragraph [0027] on page 10
a large block isolated point calculation unit for calculating a second number of isolated points contained in a large block of the image data, the large block being composed of multiple smaller blocks	Large block isolated point calculation unit (adder) 46 in Fig. 2; see, e.g., paragraph [0028] on page 10

based on an aggregated amount of the respective first number of isolated points calculated by said small block isolated point calculation unit; and	
a halftone-dot region determination unit for determining that the large block is a halftone-dot region if all small blocks in the large block have an isolated point contained therein, based on the respective first number of isolated points calculated by the small block calculation unit, and if the second number of isolated points calculated to be contained in the large block by the large block isolated point calculation unit is greater than or equal to a first prescribed value.	halftone-dot region determination unit (comparator 47, OR circuits 48, and AND circuit 49); see, e.g., paragraphs [0029]-[0031] on pages 10-12

11. An image processing method that handles image data, said method comprising the steps of:	Method illustrated in Figs. 5-6
dividing, in processing circuitry of an image processing apparatus, image data into large blocks of a prescribed size and further subdividing the large blocks into multiple smaller blocks;	Dividing unit 40 in Fig. 2; see, e.g., paragraphs [0025] and [0026] on pages 8-10 of the original specification. As illustrated in the example of Figure 3, the dividing unit 40 divides the image data into large blocks (darker rectangle) having a size of M x N pixels, and further divides the large blocks into smaller blocks (lighter rectangles) ① through ⑤
calculating, in the processing circuitry of	Large block isolated point calculation unit

the image processing apparatus, a first respective number of isolated points contained in each large block established via division and a respective second number of isolated points contained in each small block established via division; and	(adder) 46 in Fig. 2; see, e.g., paragraph [0028] on page 10
determining, in the processing circuitry of the image processing apparatus, that a specified large block among the large blocks established via division is a halftone-dot region if all small blocks in the specified large block have an isolated point contained therein, based on the calculated respective second numbers of each small block contained in the specified large block, and if the first number of isolated points calculated to be contained in the specified large block is greater than or equal to a first prescribed value.	halftone-dot region determination unit (comparator 47, OR circuits 48, and AND circuit 49); see, e.g., paragraphs [0029]-[0031] on pages 10-12; and steps S1-S8 in Fig. 5

14. An image processing method that handles image data, said method comprising the steps of:	Method illustrated in Figs. 5-6
dividing, in processing circuitry of the image processing apparatus, image data into multiple small blocks;	Dividing unit 40 in Fig. 2; see, e.g., paragraphs [0025] and [0026] on pages 8-10 of the original specification. As illustrated in the examples of Figs. 2 and 3, the dividing unit 40 divides the image data into smaller blocks ① through ⑤
calculating, in the processing circuitry of	small block isolated point calculation unit

the image processing apparatus, a respective first number of isolated points contained in each small block established via division;	(counters) 41-45 in Fig. 2; see, e.g., paragraph [0027] on page 10
calculating, in the processing circuitry of the image processing apparatus, a respective second number of isolated points contained in a large block of the image data, the large block being composed of multiple smaller blocks based on the calculated number of small block isolated points; and	Large block isolated point calculation unit (adder) 46 in Fig. 2; see, e.g., paragraph [0028] on page 10
determining, in the processing circuitry of the image processing apparatus, that the large block is a halftone-dot region if all small blocks in the large block have an isolated point contained therein, based on the calculated respective first number of isolated points in the small blocks contained in the large block, and if calculated second number of isolated points contained in the large block is greater than or equal to a first prescribed value.	halftone-dot region determination unit (comparator 47, OR circuits 48, and AND circuit 49); see, e.g., paragraphs [0029]-[0031] on pages 10-12; and steps S1-S8 in Fig. 5

VI. Grounds of Rejection to be Reviewed on Appeal

The final Office Action contains two grounds of rejection. The Board is respectfully requested to review the following grounds of rejection.

A. Claims 1-3, 6-8, 11-16, and 18-22 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Ohuchi (U.S. Patent No. 5,025,481) in view of Saitoh et al. (U.S. Patent No. 6,272,248, hereinafter "Saitoh").

B. Dependent claims 4, 5, 9, 10, 17 and 23-25 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Ohuchi in view of Saitoh and further in view of Kingetsu et al. (U.S. 6,268,935, hereinafter "Kingetsu").

VII. Argument

A. Applied References Do Not Disclose or Suggest All Recited Features of Claimed Invention

The Examiner alleges that independent claims 1, 6, 11 and 14 are unpatentable over Ohuchi and Saitoh. This rejection is legally and factually erroneous. The purported combination of Ohuchi and Saitoh cannot support the rejection of the claimed invention under 35 U.S.C. § 103(a), because these references do not establish that all the elements recited in the claimed invention were known in the prior art. See *KSR International Co. v. Teleflex, Inc.*, 82 USPQ2d 1385, 1395 (U.S. 2007); MPEP 2143.02.

Claims 1 and 6 each recite an image processing apparatus that comprises a halftone-dot region determination unit for determining whether or not a specified large block is a halftone-dot region.

Claim 1 recites that the halftone-dot region determination unit determines that a specified large block among the large blocks established by the dividing unit is a halftone-dot region (1) if <u>***all*** small blocks in the specified large block have an isolated point contained therein</u>, based on the respective second numbers calculated by the small block isolated point calculation unit, and (2) if the first number of isolated points calculated to be contained in the specified large block by the large block isolated point calculation unit is greater than or equal to a first prescribed value.

Claim 6 recites that the halftone-dot region determination unit determines that the large block is a halftone-dot region (1) if <u>***all*** small blocks in the large block have</u>

an isolated point contained therein, based on the respective first number of isolated points calculated by the small block calculation unit, and (2) if the second number of isolated points calculated to be contained in the large block by the large block isolated point calculation unit is greater than or equal to a first prescribed value.

The methods of claims 11 and 14 recite steps corresponding to the constituent elements of the image processing apparatuses of claims 1 and 6, respectively. Accordingly, claims 1, 6, 11 and 14 each comprise a halftone-dot region determination unit or determination steps which perform the following determinations:

(1) if ***all*** small blocks in the large block have an isolated point contained therein, and

(2) if the number of isolated points in the specified large block is greater than or equal to a first prescribed value,

to determine whether a large block containing the small blocks is a halftone-dot region.

The Examiner acknowledges that Ohuchi does not disclose or suggest feature (1) of claims 1, 6, 11 and 14. Ohuchi does not disclose or suggest the first determination (1) of claims 1, 6, 11 and 14. The Examiner applied Saitoh in an attempt to arrive at this feature of the claimed invention. However, the disclosure of Saitoh does not support this interpretation.

With reference to Figures 99 and 100, Saitoh discloses a halftone-dot region determination unit 15105 (see Figure 99) and halftone-dot region determination processing (step S15201) in embodiments in the disclosed Twelfth Aspect for detecting a special document such as paper money (see Column 109, line 39 *et seq.*). In the Twelfth Aspect, Saitoh discloses that in a region determined to comprise a halftone-dot region in a relevant original image, distances between peaks in density variations waves are measured. Then, it is determined whether the original image includes a special document such as paper money by determining whether inter-peak distances are constant.

The functions of the halftone-dot region determination process are disclosed in Figure 101 and Column 111, lines 23-60. In particular, Saitoh discloses that the determination of whether each block comprises the halftone-dot region includes the

following process: "the relevant block is determined to comprise the halftone-dot region if one or more peak pixels exist in the block" (see Column 11, lines 59 and 60).

Accordingly, Saitoh discloses that the halftone-dot region determination is performed for each block among a plurality of blocks that are obtained in a block production processing step (see S15302). Therefore, in contrast to the claimed invention, Saitoh discloses an opposite technique in which each block is separately processed, independent of one another, to determine whether each block individually contains a halftone-dot region.

On the contrary, claims 1, 6, 11 and 14 recite the feature of determining that a specified large block containing small blocks is a halftone-dot region if *all* small blocks in the large block have an isolated point contained therein. In contrast to the claimed invention, Saitoh does not determine whether a large block containing small blocks is a halftone-dot region if all blocks in the large block have an isolated point therein. Instead, as discussed above, Saitoh discloses that each block is separately processed to determine whether each block individually contains a halftone-dot region.

Accordingly, similar to Ohuchi, Saitoh also does not disclose or suggest a halftone-dot region determination unit or determination steps which determine (1) if all small blocks in the large block have an isolated point contained therein, to determine whether a large block containing the small blocks is a halftone-dot region, as recited in claims 1, 6, 11 and 14.

B. No Reason or Motivation to Combine References to Arrive at Claimed Invention

In addition to failing to disclose or suggest all the recited features of claims 1, 6, 11 and 14, Applicants respectfully submit that there is no reason or motivation in Ohuchi or Saitoh for achieving the combination of features (1) and (2), as recited in claims 1, 6, 11 and 14. On the contrary, Ohuchi discloses a technique of determining whether a specified block is a half-tone dot region by determining whether the specified block constitutes a halftone-dot region if that block contains more extreme points (e.g., isolated point) than neighboring blocks.

In particular, Ohuchi discloses an apparatus and method for discriminating a dot region of an image contained in a digital input image signal. The input image signal is generated by making a raster scan of a document image in which a dot image (e.g., a photograph) and a line image (e.g., a character) coexist. An input image processing part 11 stores a quantity of the received input image signal amounting to a predetermined number of scan lines that are required to discriminate the dot region. For example, the input image signal amounting to N x 3 scan lines are stored, where N denotes a number of picture elements that determines a unit block B comprising N x N picture elements for detecting the dot region (see Column 17, lines 52-66, and Figure 3).

With reference to Figure 3, Ohuchi discloses that an extreme point detecting part 12 receives the input image signal from the input image processing part 11 and successively applies a predetermined matrix comprising M x M picture elements with respect to each picture element m included in the input image signal. Figure 4A of Ohuchi illustrates a matrix comprising 3 x 3 picture elements (m_0 to m_8), Figure 4B illustrates a matrix comprising 4 x 4 picture elements (m_0 to m_{15}), and Figure 4C illustrates a matrix comprising 5 x 5 picture elements (m_0 to m_{24}). Ohuchi discloses that the extreme point detecting part 12 detects whether or not a center picture element m_0 of the matrix M x M is an extreme point that indicates a peak or valley of the density change based on the density relationships with surrounding picture elements m_1 through m_i ($i = M^2 -1$) (see Column 17, line 66 to Column 18, line 14).

With reference to Figure 3, Ohuchi discloses that a dot region detecting part 13 divides the image described by the input image signal into blocks B each comprising N x N picture elements, subdivides each block B into a plurality of small regions C_i, and counts the number of extreme points indicating the valleys for each small region C_i of each block B. Figure 5 of Ohuchi illustrates a case where N=9 and the block B comprises 9 x 9 picture elements, and Figure 16 illustrates a case where i=4 and each block B is subdivided into four smaller regions C_1, C_2, C_3 and C_4. The dot region detecting part 13 discriminates whether or not a predetermined picture element within the object block B_0 (see Figure 6) belongs to the dot region, <u>based on the relationship between a number P_0 of extreme points of the object block B_0 and numbers P_1 through P_8 of extreme points of surrounding blocks B_1 through B_8</u> (see Column 18, lines 15-31). In particular, with reference to steps S41-S45 illustrated in

Figure 17, Ohuchi discloses that each block B is subdivided into the small regions C_1 through C_4, and a number q of extreme points is obtained for each of the small regions C_1 through C_4. Step S42 determines the number Q of small regions C_i in which q=0 for each block B with respect to both the peak and valley. Step S43 discriminates whether Q is greater than a predetermined value Q_{TH}. If $Q>Q_{TH}$, step S44 sets the number P of extreme points of the block B to P=0. On the other hand, if $Q \leq Q_{TH}$, step S45 obtains the sum of the numbers of q for the peaks and valleys, and sets the larger sum Σq as the number P of extreme points in this block B (see Column 20, lines 39-52).

With reference to Figure 3, Ohuchi discloses that a region discrimination signal output part 14 outputs a discrimination signal that indicates whether each picture element belongs to the dot region or the line region based on the result of the detection made in the dot region detecting part 13 (see Column 18, lines 32-36). As described above, the dot region detecting part 13 of Ohuchi discriminates whether or not a predetermined picture element within an object block B belongs to the dot region <u>based on the relationship between a number P_0 of extreme points of that object block B and numbers P_1 through P_8 of extreme points of the surrounding blocks</u> (see Column 18, lines 15-31).

Accordingly, Ohuchi discloses that the number P_B of extreme points in regions C_1 to C_i of block B are counted (see steps S41 to S45 in Figure 17), and the number P_B of extreme points of that block B are compared with the number P_1 through P_8 of extreme points of the surrounding blocks. Thus, Ohuchi discloses that the determination of whether block B belongs to the dot region is dependent on the number of extreme points in block B in comparison with the number of extreme points of the surrounding blocks B_1 to B_8.

Accordingly, the collective disclosures of Ohuchi and Saitoh suggest an opposite technique to that of claims 1, 6, 11 and 14. In particular, the purported combination of Ohuchi and Saitoh would suggest to one skilled in the art that each block is separately processed, independent of one another, to determine whether each block individually contains a halftone-dot region, according to the disclosure of Saitoh, and then, according to the disclosure of Ohuchi, each individual block would be compared to neighboring blocks to determine if that individual block has more

extreme points than the neighboring blocks, to determine whether that specific individual block is a halftone-dot region.

The proposed combination of Ohuchi and Saitoh, however, does not disclose, suggest or contemplate the features of determining whether a large block containing small blocks is a half-tone dot region (1) if ***all*** small blocks in the large block have an isolated point contained therein, and (2) if the number of isolated points in the specified large block is greater than or equal to a first prescribed value.

Therefore, in addition to failing to disclose or suggest all the recited features of claims 1, 6, 11 and 14, Appellants respectfully submit that neither Ohuchi nor Saitoh, whether considered individually or in combination, provide any reason or motivation to achieve the combination of features (1) and (2) for determining whether a large block containing small blocks is a halftone-dot region.

Accordingly, for at least the foregoing reasons, Appellants respectfully submit that claims 1, 6, 11 and 14 are patentable over Ohuchi and Saitoh.

C. Dependent Claims

Dependent claims 2, 3, 7, 8, 12, 13, 15, 16 and 18-22 recite further distinguishing features over Ohuchi and Saitoh.

For instance, claim 2 recites the feature that the halftone-dot region determination unit is operable to determine that the specified large block is a halftone-dot region if the respective second number of isolated points in each small block contained in the large block is greater than or equal to a second prescribed value.

The Examiner alleges that Ohuchi discloses the features of claim 2 with reference to Ohuchi's disclosure of determining the number of extreme points q obtained for each of the small regions C_1 through C_4. Ohuchi discloses that the only basis for determining whether a small region C is a halftone-dot region is whether the number of extreme points of one small region exceeds the number of extreme points of surrounding small blocks. In rejecting claim 1, from which claim 2 depends, the Examiner alleged that the number of extreme points corresponds to the "first prescribed value" as recited in claim 1. However, in rejecting claim 2, the Examiner alleged that this same metric (i.e., the number of extreme points) also corresponds to the "second prescribed value" as recited in claim 2.

Claim 2 further recites a second prescribed value, which is a different value than the first prescribed value, and claim 3 further recites that the second prescribed value is smaller than the first prescribed value.

Ohuchi, however, does not disclose or suggest that multiple prescribed values (first and second) are used in determining whether a specified large block is a halftone-dot region. On the contrary, the only metric of Ohuchi for determining whether a small region is a halftone-dot region is whether the number of extreme points of that small region is greater than the number of extreme points of the surrounding small blocks. The number of extreme points, however, cannot correspond to <u>both</u> the first and second prescribed values, since the number of extreme points is the same metric.

Accordingly, in addition to failing to disclose or suggest the feature of determining whether a large block containing small blocks is a halftone-dot region, Ohuchi also does not disclose or suggest determining that a specified large block is a halftone-dot region if the respective second number of isolated points in each small block contained in the large block is greater than or equal to a second prescribed value, as recited in claim 2. Moreover, Ohuchi also does not disclose or suggest different values for the metrics, i.e., that the second prescribed value is smaller than the first prescribed value.

Therefore, claims 2 and 3 recite additional distinguishing features over Ohuchi. Saitoh also fails to disclose or suggest the features of claims 2 and 3.

Accordingly, Appellants respectfully submit that claims 2 and 3 are also patentable over Ohuchi and Saitoh.

Claims 7 and 8 recite features similar to claims 2 and 3, respectively. Claims 12 and 13 recite features similar to claims 2 and 3, respectively. Claims 15 and 16 recite features similar to claims 2 and 3, respectively. Accordingly, Appellants respectfully submit that dependent claims 7, 8, 12, 13, 15 and 16 are also patentable over Ohuchi and Saitoh.

Dependent claims 18-22 also recite further distinguishing features over the applied references. For instance, claims 19 and 20 further define the halftone-dot region determination unit as recited in claim 1. The Examiner concedes that Ohuchi does not disclose or suggest the halftone-dot region determination unit of claim 1. Yet, the Examiner, in rejecting claims 19 and 20, alleges that Ohuchi somehow

discloses the features of the halftone-dot region determination unit. This interpretation is not supportable. By failing to disclose or suggest the halftone-dot region determination unit of claim 1, Ohuchi cannot disclose or suggest the additional features of the halftone-dot region determination unit as recited in claims 19 and 20.

For instance, claim 19 recites that the halftone-dot region determination unit comprises a second determination unit for determining whether each of the plurality of isolated point counters of the small block isolated point calculation unit <u>have each counted at least one isolated point</u> in the corresponding small block contained in the large block. In attempting to arrive at the claimed invention, the Examiner alleged that Column 18, lines 15-21 of Ohuchi disclose the features of the second determination unit as recited in claim 19. This assertion is not supportable. Column 18, lines 15-21 merely disclose that the dot region detecting part 13 subdivides each block B into a plurality of small regions C_1 through C_i, and counts the number of extreme points in each small region. At no point does this section of Ohuchi, nor any or other section of Ohuchi, disclose or suggest that the dot region detecting part 13 detects whether <u>all the small regions</u> C_1 through C_i each contain an extreme point. On the contrary, Ohuchi merely discloses that the dot region detecting part 13 detects whether the sub-divided blocks contain an extreme point. Ohuchi does not disclose or suggest any condition that the dot region detecting part 13 must determine that each of the small regions C_1 through C_i each contain an extreme point.

Furthermore, Ohuchi also fails to disclose or suggest the third determination unit as recited in claim 19. The Examiner alleged that Column 19, lines 8-21 of Ohuchi disclose the features of the third determination unit as recited in claim 19. This assertion is not supportable. This section of Ohuchi, nor any other section of Ohuchi, does not disclose or suggest that the dot region detecting part determines whether a large block (e.g., block B) is a halftone-dot region based on a determination of whether <u>each small region</u> contained in the large block B has an extreme point. On the contrary, Column 19, lines 8-21 merely disclose that if the small regions of a block B contain an extreme point, the number of extreme points in the block is regarded as zero (0) if the number of extreme points in the small regions do not exceed a threshold value.

Accordingly, in addition to failing to disclose or suggest the features of the claim 1, Appellants respectfully submit that Ohuchi does not disclose or suggest the features of the second and third determination units as recited in claim 19. Furthermore, Appellants respectfully submit that Ohuchi does not disclose or suggest the features of the third determination unit as recited in claim 20, because the dot region detecting part 13 does not determine that a large block B is a halftone-dot region if each of the small regions C in that block contain an extreme point.

Similar to Ohuchi, Saitoh also does not disclose or suggest the features of claims 19 and 20.

Therefore, Appellants respectfully submit that claims 19 and 20 recite further distinguishing features over Ohuchi and Saitoh.

Dependent claim 21 further defines the features of claim 6, which is patentable over Ohuchi and Saitoh for the reasons presented above. Claim 21 recites that the second number of isolated points contained in the large block equals an aggregate of the respective first number of isolated points that the small block isolated point calculation unit calculates for each small block composing the large block. The Examiner alleged that the features of claim 21 are disclosed in Column 18, lines 15-21 of Ohuchi. This assertion is not supportable. This section of Ohuchi merely discloses that the dot region detecting part 13 subdivides each block B into a plurality of small regions C_1 through C_i, and counts the number of extreme points in each small region. At no point does this section of Ohuchi, nor any or other section of Ohuchi, disclose or suggest that the number of isolated points in the large block B equals an aggregate of the number of extreme points in the divided small regions C_1 through C_i of the large block B. On the contrary, as discussed above, Ohuchi discloses that a center picture element m_0 of the matrix M x M is an extreme point that indicates a peak or valley of the density change based on the density relationships with surrounding picture elements m_1 through m_i ($i = M^2 -1$) (see Column 17, line 66 to Column 18, line 14, and Column 18, lines 44-49). Accordingly, Ohuchi merely compares whether the central small region of a block (e.g., block B_0) has a greater number of extreme points than the central small region of a neighboring block (e.g., block B_1). Ohuchi does not disclose or suggest that the number of extreme points in a large block equals an aggregate of the number of extreme points of each small region C_1 through C_i in that block B.

Accordingly, Appellants respectfully submit that Ohuchi fails to disclose or suggest the features of claim 21. Saitoh also fails to disclose or suggest the features of claim 21.

Claim 22, which depends from claim 6, recites that the large block isolated point calculation unit is operable to calculate the second number of isolated points counted in the large block by calculating an aggregate of the respective first number of isolated points contained in a plurality of contiguous small blocks within a predetermined area of the image data. The Examiner again cited Column 18, lines 15-31 of Ohuchi as allegedly disclosing the features of claim 22. This assertion is not supportable. As noted above, this section of Ohuchi merely discloses that the dot region detecting part 13 subdivides each block B into a plurality of small regions C_1 through C_i, counts the number of extreme points in each small region, and compares whether the central small region of a block (e.g., block B_0) has a greater number of extreme points than the central small region of a neighboring block (e.g., block B_1). Ohuchi does not disclose or suggest that the number of extreme points in a large block equals an aggregate of the number of extreme points contained in a plurality of contiguous small regions C within a predetermined area of the image data.

Accordingly, Appellants respectfully submit that Ohuchi fails to disclose or suggest the features of claim 22. Saitoh also fails to disclose or suggest the features of claim 22.

Therefore, for at least the foregoing reasons, Appellants respectfully submit that dependent claims 2, 3, 7, 8, 12, 13, 15, 16 and 18-22 recite further distinguishing features over Ohuchi and Saitoh

D. Rejection of Claims 4, 5, 9, 10, 17 and 23-25

Dependent claims 4, 5, 9, 10, 17 and 23-25 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Ohuchi in view of Saitoh and further in view of Kingetsu et al. (U.S. 6,268,935, hereinafter "Kingetsu"). However, similar to Ohuchi and Saitoh, Kingetsu also does not disclose or suggest features (1) and (2) of claims 1, 6, 11 and 14. Consequently, Kingetsu cannot cure the deficiencies of Ohuchi and Saitoh for failing to disclose or suggest all the recited features of the claimed invention.

VIII. Claims Appendix

See attached Claims Appendix for a copy of the claims involved in the appeal.

IX. Evidence Appendix

See attached Evidence Appendix for copies of evidence relied upon by Appellants.

X. Related Proceedings Appendix

See attached Related Proceedings Appendix for copies of decisions identified in Section II, supra.

XI. Conclusion

Appellants have pointed to errors in the rejection of the claimed invention including mischaracterizations of the applied art relevant to the pending claims, in addition to the failure of the applied art to disclose or suggest all the recited features of the claimed invention. Accordingly, Appellants respectfully request that the final rejection be overturned and that the application be returned to the Examiner for prompt allowance.

Respectfully submitted,

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VIII. CLAIMS APPENDIX

The Appealed Claims

1. An image processing apparatus that handles image data, comprising:

a dividing unit for dividing image data into large blocks of a prescribed size and further subdividing the large blocks into multiple smaller blocks;

a large block isolated point calculation unit for calculating a first number of isolated points contained in each large block established by said dividing unit;

a small block isolated point calculation unit for calculating a respective second number of isolated points contained in each small block established by said dividing unit; and

a halftone-dot region determination unit for determining that a specified large block among the large blocks established by the dividing unit is a halftone-dot region if all small blocks in the specified large block have an isolated point contained therein, based on the respective second numbers calculated by the small block isolated point calculation unit, and if the first number of isolated points calculated to be contained in the specified large block by the large block isolated point calculation unit is greater than or equal to a first prescribed value.

2. An image processing apparatus as claimed in Claim 1,

wherein said halftone-dot region determination unit is operable to determine that the specified large block is a halftone-dot region if the respective second number of isolated points in each small block contained in the large block is greater than or equal to a second prescribed value.

3. An image processing apparatus as claimed in Claim 2,

wherein the second prescribed value is smaller than the first prescribed value.

4. An image processing apparatus as claimed in Claim 1, further comprising:

an image processing unit for correcting the image data based on the results of determination by said halftone-dot region determination unit.

5. An image processing apparatus as claimed in Claim 4, further comprising:

an image forming unit for performing image formation based on the image data corrected by said image processing unit.

6. An image processing apparatus that handles image data, comprising:

a dividing unit for dividing image data into multiple small blocks;

a small block isolated point calculation unit for calculating a respective first number of isolated points contained in each small block established by said dividing unit;

a large block isolated point calculation unit for calculating a second number of isolated points contained in a large block of the image data, the large block being composed of multiple smaller blocks based on an aggregated amount of the respective first number of isolated points calculated by said small block isolated point calculation unit; and

a halftone-dot region determination unit for determining that the large block is a halftone-dot region if all small blocks in the large block have an isolated point

contained therein, based on the respective first number of isolated points calculated by the small block calculation unit, and if the second number of isolated points calculated to be contained in the large block by the large block isolated point calculation unit is greater than or equal to a first prescribed value.

7. An image processing apparatus as claimed in Claim 6,

wherein said halftone-dot region determination unit is operable to determine that the respective first number of isolated points in each small block contained in the large block is greater than or equal to a second prescribed value.

8. An image processing apparatus as claimed in Claim 7,

wherein the second prescribed value is smaller than the first prescribed value.

9. An image processing apparatus as claimed in Claim 6, further comprising:

an image processing unit for correcting the image data based on the results of determination by said halftone-dot region determination unit.

10. An image processing apparatus as claimed in Claim 9, further comprising:

an image forming unit for performing image formation based on the image data corrected by said image processing unit.

11. An image processing method that handles image data, said method comprising the steps of:

dividing, in processing circuitry of an image processing apparatus, image data into large blocks of a prescribed size and further subdividing the large blocks into multiple smaller blocks;

calculating, in the processing circuitry of the image processing apparatus, a first respective number of isolated points contained in each large block established via division and a respective second number of isolated points contained in each small block established via division; and

determining, in the processing circuitry of the image processing apparatus, that a specified large block among the large blocks established via division is a halftone-dot region if all small blocks in the specified large block have an isolated point contained therein, based on the calculated respective second numbers of each small block contained in the specified large block, and if the first number of isolated points calculated to be contained in the specified large block is greater than or equal to a first prescribed value.

12. An image processing method as claimed in Claim 11,

wherein said determining step comprises determining that the specified large block is a halftone-dot region if the respective second number of isolated points in each small block contained in the large block is greater than or equal to a second prescribed value.

13. An image processing method as claimed in Claim 12,

wherein the second prescribed value is smaller than the first prescribed value.

14. An image processing method that handles image data, said method comprising the steps of:

dividing, in processing circuitry of the image processing apparatus, image data into multiple small blocks;

calculating, in the processing circuitry of the image processing apparatus, a respective first number of isolated points contained in each small block established via division;

calculating, in the processing circuitry of the image processing apparatus, a respective second number of isolated points contained in a large block of the image data, the large block being composed of multiple smaller blocks based on the calculated number of small block isolated points; and

determining, in the processing circuitry of the image processing apparatus, that the large block is a halftone-dot region if all small blocks in the large block have an isolated point contained therein, based on the calculated respective first number of isolated points in the small blocks contained in the large block, and if calculated second number of isolated points contained in the large block is greater than or equal to a first prescribed value.

15. An image processing method as claimed in Claim 14,

wherein said determining step comprises determining that the large block is a halftone-dot region if the respective first number of isolated points in each small

block contained in the large block is greater than or equal to a second prescribed value.

16. An image processing method as claimed in Claim 15,

wherein the second prescribed value is smaller than the first prescribed value.

17. An image processing apparatus as claimed in claim 5, further comprising a character determination unit for determining whether at least one character region exists in the image data, wherein:

said image processing unit is operable to correct the image data based on the results of determination by said halftone-dot region determination unit and said character determination unit; and

said image forming unit is operable to perform image formation based on the image data corrected by said image processing unit.

18. An image processing apparatus as claimed in claim 1, wherein said small block isolated point calculation unit comprises a plurality of isolated point counters respectively corresponding to the multiple small blocks contained in a large block, each of said plurality of isolated point counters being operable to count the respective second number of isolated points contained in a corresponding one of the small blocks contained in the large block.

19. An image processing apparatus as claimed in claim 18, wherein said halftone-dot region determination unit comprises:

a first determination unit for determining whether the calculated first number of isolated points in a large block equals or exceeds the first threshold value;

a second determination unit for determining whether each of said plurality of isolated point counters of said small block isolated point calculation unit have each counted at least one isolated point in the corresponding small block contained in the large block; and

a third determination unit for determining whether the large block is a halftone-dot region based on the determination results of said first determination unit and second determination unit.

20. An image processing apparatus as claimed in claim 19, wherein said third determination unit is operable to determine that the large block is a halftone-dot region if said first determination unit determines that the calculated first number of isolated points in the large blocks equals or exceeds the first threshold value, and said second determination unit determines that each of said isolated point counters have counted at least one isolated point in the corresponding small block contained in the large block.

21. An image processing apparatus as claimed in claim 6, wherein the second number of isolated points contained in the large block equals an aggregate of the respective first number of isolated points that said small block isolated point calculation unit calculates for each small block composing the large block.

22. An image processing apparatus as claimed in claim 6, wherein said large block isolated point calculation unit is operable to calculate the second number of isolated points contained in the large block by calculating an aggregate of the respective first number of isolated points contained in a plurality of contiguous small blocks within a predetermined area of the image data.

23. An image processing apparatus as claimed in claim 9, further comprising a character determination unit for determining whether at least one character region exists in the image data, wherein:

said image processing unit is operable to correct the image data based on the results of determination by said halftone-dot region determination unit and said character determination unit; and

said image forming unit is operable to perform image formation based on the image data corrected by said image processing unit.

24. An image processing method as claimed in claim 11, further comprising the steps of:

correcting the image data based on the results of determination of said determining step; and

forming images based on the corrected image data.

25. An image processing method as claimed in claim 14, further comprising the steps of:

correcting the image data based on the results of determination of said determining step; and

forming images based on the corrected image data.

IX. EVIDENCE APPENDIX

None

X. RELATED PROCEEDINGS APPENDIX

None